SOFTWARE ENGINEERING QUALITY TO ENHANCE THE CUSTOMER SATISFACTION LEVEL OF THE ORGANIZATION

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ABSTRACT

Quality is partly about the number defects delivered in a piece of software and partly about how the stakeholders and customers experience the software. Experience is typically measured as customer satisfaction. Customer satisfaction is a measure of how products and services supplied by a company meet or surpass customer expectations. Customer satisfaction is impacted by all three aspects of software quality: functional, structural and process.

Keywords: Customer Satisfaction Level of the Organization

1. INTRODUCTION

The quality of software is assessed by a number of variables. These variables can be divided into external and internal quality criteria. External quality is what a user experiences when running the software in its operational mode. Internal quality refers to aspects that are code-dependent, and that are not visible to the end-user. External quality is critical to the user, while internal quality is meaningful to the developer only. Some quality criteria are objective, and can be measured accordingly. Some quality criteria are subjective, and are therefore captured with more arbitrary measurements

2. LITERATURE REVIEW

By the IEEE Standard Appendix of Software Engineering terminology quality is evaluated as, "The degree to which a system, component, or process meets specified requirements", IEEE further explained quality as "The degree to which a system, component, or process meets customer or user needs or expectations". It is urged by" a product's quality is a function of how much it changes the world for the better". Quality is conformance to predefined specifications that meet the customers' needs.it is urged by quality refers to the extent or degree to which a customer's requirement is met. It is clear from these definitions that quality of software refers to the measurement of various characteristics or elements of software system ranging from the

requirement to implementation. These characteristics include availability, reliability, functionality, efficiency, usability and users' satisfaction etc.

Quality of a software product can be evaluated with methodologies, standards, and techniques. For measuring, improving and assuring the software quality. Quality divided into two parts as internal quality, external quality. Internal quality is gauged by software professionals in the phase of Developing and testing, whereas external internal quality can be achieved by the user's end. It is clear from these definitions that quality of software refers to the measurement of various characteristics or elements of software system ranging from the requirement to implementation. According to, criteria defined, that several elements constitute the quality of a system. These elements include availability, reliability, functionality, efficiency, usability and users' satisfaction etc.

3. SOFTWARE QUALITY ATTRIBUTES

Software Quality attributes include: affordability, availability, dependability, efficiency, predictability, reliability, responsiveness, safety, security, usability, etc

3.1. Defect Management Approach

A software defect can be regarded as any failure to address end-user requirements. Common defects include missed or misunderstood requirements and errors in design, functional logic, data relationships, process timing, validity checking, coding, etc. The defect management approach is based on counting and managing defects. Defects are commonly categorized by severity, and the numbers in each category are used for planning. More mature software development organizations use tools such as defect leakage matrices (for counting the numbers of defects that pass through development phases prior to detection) and control charts to measure and improve development process capability.

3.2. Quality Attributes Approach

This approach to software quality is best exemplified by fixed quality models, such as ISO/IEC9126. This standard describes a hierarchy of eight quality characteristics, each composed of sub-characteristics shown in Figure 1
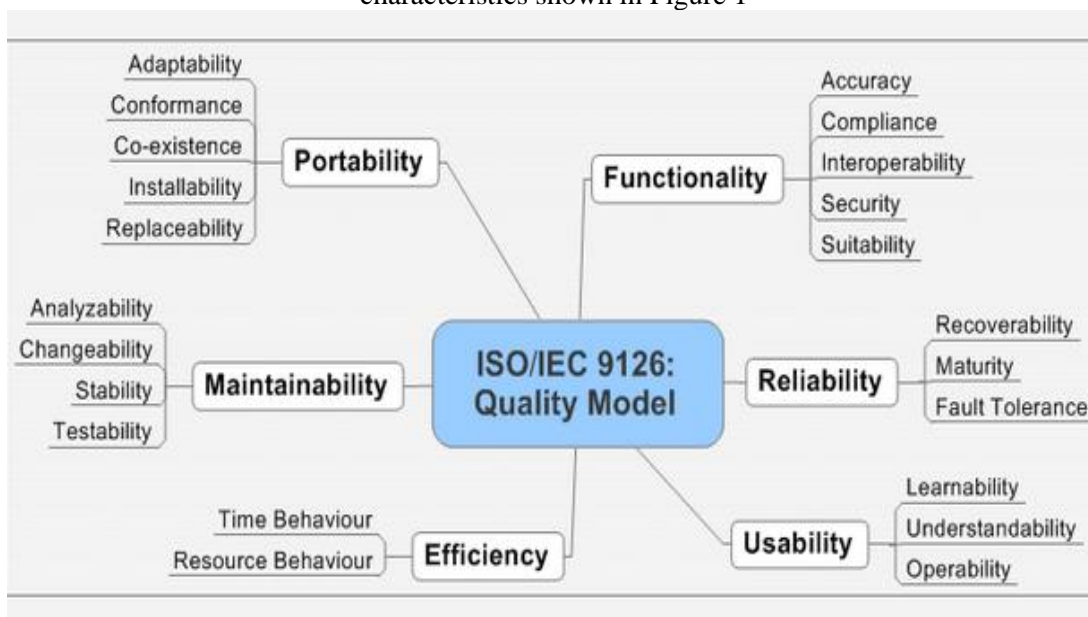

Figure 1 of Eight quality characteristics

Table 1 Quality Parameters

Safety	Understandability	Portability
Security	Testability	Usability
Reliability	Adaptability	Reusability
Resilience	Modularity	Efficiency
Robustness	Complexity	Learnability

- Functional suitability
- Reliability
- Operability
- Performance efficiency
- Security
- Compatibility
- Maintainability
- Transferability

Additionally, the standard defines a quality in use model composed of six characteristics: Effectiveness

- Efficiency
- Satisfaction
- Safety
- Usability

4. SOFTWARE QUALITY MANAGEMENT

Software Quality Management ensures that the required level of quality is achieved by submitting improvements to the product development process. SQA aims to develop a culture within the team and it is seen as everyone's responsibility.

Software Quality management should be independent of project management to ensure independence of cost and schedule adherences. It directly affects the process quality and indirectly affects the product quality.

Figure 2 SQA Process

Quality Assurance - QA aims at developing Organizational procedures and standards for quality at Organizational level.

Quality Planning - Select applicable procedures and standards for a particular project and modify as required to develop a quality plan.

Quality Control - Ensure that best practices and standards are followed by the software development team to produce quality products.

5. PRINCIPLES OF QUALITY RISK MANAGEMENT

- Evaluationoftherisktoqualityshouldbebasedonscientificknowledgeandultimately link to the protection of the patient

- The levelofeffort,formalityanddocumentationofthequalityriskmanagementprocess should be commensurate with the level of risk.

- Benefits of Quality Management

- A fully documented QMS will ensure that two important requirements are met:

- Customers' requirements Needs Confidence in the ability of the organisation to deliver the desired product and service consistently meeting their needs and expectations.

- Organisation's requirements Both internally and externally, and at an optimum cost with efficient useof the available resources materials, human, technology and information
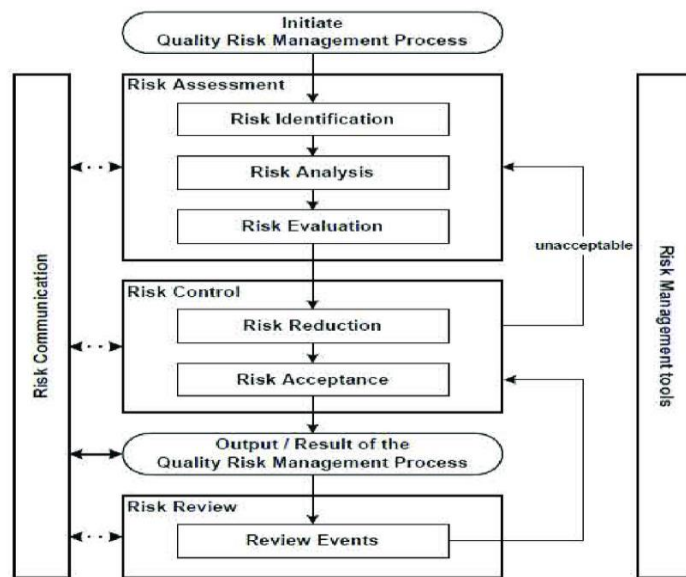

Figure 3 Overview of a typical quality risk management process.

6. CUSTOMER SATISFACTION AND PRODUCT QUALITY

These terms are typically erroneously equated. In fact, once a consumer doesn't feel smart about the results of cooperation, it doesn't essentially mean a delivered product is of inferiority. There are such a big amount of factors that are ready to influence customers' opinion on partnering with a software development company.

For instance, IT engineers managed to make an excellent application however did not deliver it in time, and communication with a consumer wasn't sleek enough. These problems may result in an unfavorable impression in spite of a superb software solution. Thus, a high-quality product isn't the sole issue to make sure customers' positive testimonials and references.

7. INCREASING CUSTOMER SATISFACTION

7.1. Conduct regular surveys and ensure close cooperation

Make this a habitual daily part of your project plan. Ask more questions during meetings and video-conferences to gather sufficient information about the client's expectations. This simple method allows detecting a problem before its actual occurrence. You can also challenge your company's quality manager to draw up a list of questions to quickly understand whether a client is happy with a service or not.

7.2. Quality assurance

Bring your quality management system in line with ISO 9001:2000 standard. It allows monitoring of the products quality, services, and other processes in an IT company. Credible information about the real quality of the company's services and products helps flexibly manage production processes, monitor and resolve problem cases, and avoid the same mistakes in future. Day-to-day quality monitoring helps objectively evaluate the level of services. Impeccable quality assurance in a software development company results in the following advantages:

A customer willingly accepts the outcome of developers' work

A software services provider deals with no complaints on quality of a product and services

There is no need to spend additional resources to correct mistakes which appear after an app/system launch.

7.3. Monitoring user feedback

It's important to constantly monitor the fate of a solution, even if a client is a product owner and takes care of further project development and promotion. It's the task for a marketing department to gather end-user reviews and analyze them. Collecting this information allows understanding users attitude towards a software application and a company which created this solution.

7.4. Customer survey after completing a project

To get the full picture of customers' attitude to service quality, it's better to use not only one questionnaire but a complex of them.

Customer Satisfaction Score (CSAT) is one of the most popular methods of measuring customer satisfaction. Ask clients to rate the quality of the services they received from your company, e.g. by giving points from 1 to 10.

Customer Effort Score (CES) is a survey allowing you to find out client's overall impression about working with you. Ask "how easy was it to solve your problem with our assistance?" and provide possible answers.

Net Promoter Score (NPS) helps to understand how loyal a customer is. Create a survey with a question similar to "how likely is that you will recommend our company to somebody?". This is how you will define the clients who will probably come back to you with new projects.

8. CONCLUSION

Software quality is a nuanced concept that reflects many factors, some of which are functional, structural or process related. Satisfaction is a reflection of quality from a different perspective than measuring defects or code structure. The essence of customer satisfaction is the very simple question: Are you happy with what we delivered? Knowing if the team, stakeholders,

and customers are happy with what was delivered or the path that was taken to get to that delivery is often just as important as knowing the number of defects that were delivered.

To ensure the high level of customers satisfaction, you should always keep an eye on quality assurance, ask questions, and support close cooperation with a client. In this case, you can be sure that you are on the same page with your customers and know exactly what they need.

REFERENCES

[1]   Pressman, R.S., Software engineering: a practitioner's approach. McGraw Hill International Edition, 2005: p. 466-472

[2]   Aziri, B., Managing Quality: With Special Emphasizes on SME's in The Pollog Region. Publications in International Scientific Publications: Economy & Business Journal, 2015. 9(1): p. 337-342

[3]   Deepa Ann Jacob and Dr. M. Rajeswari, Customer Satisfaction and Technology Advancement- A Comparative Study between Public and Private Sector Banks in Chennai, International Journal of Mechanical Engineering and Technology, 9(10), 2018, pp. 334–338.

[4]   Walgren, C. J. C., Ruble, C. A., &Donthu, N, Brand equity, brand preference, And purchase intent. Journal of advertising, 24(3), 1995, pp25-40

[5]   Dr. D. Rajasekar and Dr. A. Krishna Sudheer, A Study on Customer Satisfaction towards 'Ruler Pipes Pvt Ltd, Andrapradesh, International Journal of Mechanical Engineering and Technology 8(11), 2017, pp. 628–634.

[6]   Farid, S., et al., Gauging Quality of Software Products Using Metrics. University of Engineering and Technology Taxila. Technical Journal, 2017. 22(1): p. 121

[7]   G. Chandramowleeswaran and Dr. K. Uma, A Study on Customer Service Evaluation In Securing Customer Satisfaction. International Journal of Marketing and Human Resource Management, 6(3), 2015, pp. 75- 82.

[8]   Dr. V. VenkataNarayana and Dr. A. Kanaka Durga, Customer Segmentation -A Case of Increase In Customer Satisfaction Levels with SegmentSpecific Customer Service Strategies. International Journal of Computer Engineering & Technology, 8(6), 2017, pp. 89–94.

[9]   B. Al Mannai, S. Suliman and Y. Al Alawai, Implementation Effect on Bahrain Industrial Performance, International Journal of Industrial Engineering Research and Development, 8(1), 2017, pp. 27–48.

[10]   Keller, K. L, Conceptualizing, measuring, and managing customer-based brand equity. The Journal of Marketing, 57(1), 1993, pp1-22.

[11]   Dr. J. Vijayakumar, V.S. HarshithBabu, Dr. B.R. Venkatesh and Dr. M.A. Sureshkumar, Impact of Retailer Brand Equity on Customer Loyalty with Customer Satisfaction in Selected Retail outlets in Bangalore City. Journal of Management, 5(5), 2018, pp. 23–31.